Stanford

Yonatan Winetraub

Instructor, Structural Biology

Bio

BIO

I believe that disease and biological functions are best studied when conjugating information from multiple imaging modalities each with their own strengths (spatiotemporal resolution, 3D, contrast). I aim to develop next-generation medical imaging technologies that would allow the creation of hematoxylin and eosin (H&E) biopsy-like images but without cutting the tissue and in real time. This imaging technology may provide both new basic understanding of cancer development, and clinical tools to aid in early diagnosis and tumor margin detection for better treatment management of cancer patients.

While skipping undergraduate training, I have received a multidisciplinary training bridging engineering, physics, signals processing, biology and imaging modalities including MRI, EEG (during MSc), ultrasound, Optical Coherence Tomography (OCT) and other optical imaging (during PhD). In addition, starting a space program that hard landed the first private robotic mission to the moon has taught me how to break down a moonshot-type problem to individual tangible projects, which is transferable to other endeavors such as biomedical imaging.

In my future work, I'm interested in further utilizing optical imaging to demonstrate virtual H&E biopsy on tumors, giving surgeons the ability to diagnose various skin cancer types but before cutting. More broadly, the ability to correlate in vivo OCT with histology sections ex vivo can reveal new mechanisms or functions in their 3D context and evolution over time and can lead to new understandings on their role in health and disease.

ACADEMIC APPOINTMENTS

- Instructor, Structural Biology
- Member, Wu Tsai Neurosciences Institute

PROGRAM AFFILIATIONS

- SPARK at Stanford

LINKS

- Website: https://sites.google.com/stanford.edu/yolab/home?authuser=1

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

My interests span non-invasive imaging for early cancer diagnosis and space exploration.

I earned my PhD in Biophysics at Stanford University School of Medicine and am a Bio-X Bowes fellow focusing on utilizing Optical Coherence Tomography (OCT) and machine learning to create virtual histology tools to image cancer non invasively at a single cell resolution, allowing physicians to skip biopsy (read more about the research). Prior to my PhD at Stanford, I co-founded SpaceIL, a non-profit organization that launched the first private interplanetary robotic mission to the Moon, crash landing on April 11, 2019.